tion offered to them, and, knowing the want of judgment which *has* been shown in many cases, and the large interests at stake, we would awaken the attention of Directors to the importance of this point, and exhort them to be assured of competent advice. An immediate *review* of the securities in their hands might be serviceable. We speak with seriousness, because with knowledge.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At an ordinary meeting, held on the 3rd inst., Mr. Bellamy in the chair, the following members were elected:—Messrs. J. B. Bunning, C. R. Cockerell, R.A., G. G. Scott, and W. C. Stow, as Fellows; and Messrs. R. P. Pope, and M. D. Wyatt, as Associates. A paper was then read "On the Ancient Architecture of Scotland," by Mr. R. W. Billings, of which we give an abstract.

At a meeting on the 17th instant, Mr. S. Smirke in the chair, Messrs. R. Hesketh and R. W. Mylne were elected fellows; and Mr. H. H. Burnell, associate. A brief memoir of the late Mr. Pocock, fellow, was communicated. Mr. Donaldson, honorary secretary, then read a paper "On the Manufacture of Glass, and its application to Architectural purposes," to which we shall revert hereafter. In the course of it the lecturer described plate-glass as both cast and *blown*, and alluded to the "rough-plate glass" case, as set forth in The Builder.

Mr. Tite said he thought that speaking of plate-glass as both blown and cast was likely to lead to confusion. He knew nothing of *blown* plate himself, and wished to know where it is now made. Mr. Tite mentioned the introduction of "French and German plate," and the manufacture, by Mr. Chance, of what he called "patent plate," to meet this. When polished, this could scarcely be discriminated from plate-glass proper. It was necessary to call this "patent plate" in specifications, or a different material was furnished. After mentioning the characteristics of glass in various conditions, he said (to maintain his character of *laureate*)—

> "Honour's like the glassy bubble
> Which costs philosophers much trouble!
> The least part cracked the whole doth die,
> And wits are cracked to find out why."

Mr. Swinburne, as a practical man, said in reply to the question, that *blown* plate was made here before the last speaker was born, and continued in use till six or seven years before the duty was repealed. At one time little could be obtained *but* blown plate.

Mr. Jennings denied that blown glass was plate glass.

Mr. Billings thought that the use of glass and iron ought to have produced a new style of architecture, and that it would have done so but for the folly of Governments.

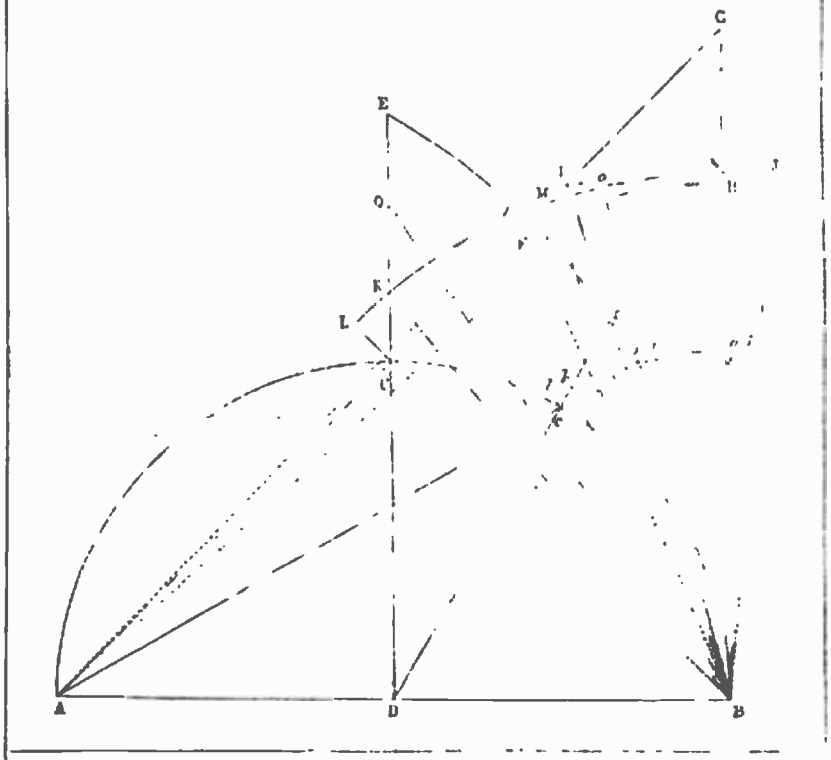
The Chairman alluded to the indestructibility of glass when quite pure, and showed how it corrodes when this is not the case and metallic oxides are present. Some means of ascertaining with certainty the purity of glass were much to be desired.

Mr. C. H. Smith thought it might be useful to mention, that, finding some 1½-inch glass slabs, 5 feet by 4 feet, which were about to be laid in connection with pavement at St. Katherine's Docks, had not a fair edge to make a joint to, he had sought to have them made square by the dealer, and failing in that, had successfully squared them with the chisel in the same way as a piece of marble would be squared. Slabs might be divided by a plain-edged saw.

Mr. G. R. Burnell mentioned, with respect to the size of looking-glasses, that at the late Exposition in Paris a plate was shewn 13 feet 9 inches by 8 feet 8 inches, price 140*l.*; and a concave reflector, 4 feet 7 inches square.

Inigo Jones.—The Shakspeare Society have just now issued an interesting contribution to architectural biography, in the shape of a small volume containing a life of Inigo Jones, by Mr. P. Cunningham, and remarks on some of his sketches for masques by Mr. Planché. The life gives some new and interesting matter, and we shall take an early opportunity to place it prominently before our readers.

A CYCLOMETER.



A CYCLOMETER.

Describe the semicircle ABC. With radius AB describe the arc BE. Draw the secant DCE at right angles to AB. Draw the secant ACFG, making the arc BF equal to the arc BC. Draw the tangent BG, the chord BC, and the chord BF, bisecting the angle CBG. With radius BF describe the arc FH. Draw HI parallel to AB. Make the angles HBJ and and CBK equal to the angle FBI. With radius BK describe the arc LKMNJ. Draw BM bisecting the angles LBJ, KBN, and FBI. Then BM is to the arc BF as BK is to the arc BC, which is as much as saying that the two equal right lines BM and BK are equal in length to the two equal arcs BF and BC.

Take any other arc of the quadrant, as Bc, proceed as before, and extend Bm, meeting the arc LJ in o, then Bm : arc Bf :: Bk : arc Bc :: mo : arc Cc.

If a right line Bp be given, and an arc equal to it in length is required, proceed according to the dotted lines to find the points F and C, taking care that the angle on either side of FB is equal to half the angle on either side of CB, for it is obvious that the construction cannot be true, unless the different angles vary together from greatest to least in a constant ratio either of one to one or of two to one.

It is also evident if we conceive the line BQ to coincide with the chord BC, and BI with the chord BF, and the angles CBQ and FBI to increase together from zero in the ratio of two to one; that since BC is less than BF, and BQ is greater than BI, there can be only two lines (determined by this law) between the limits CB and QB and FB and IB which can be equal to each other, like the arcs BC and BF.

J. P. W.

Improvements in Tunnelling.—Mr. Samuel Dunn, of Doncaster, has secured a patent for an improved arrangement for tunnelling under rivers, and other similar purposes. He employs a moveable shield similar to the one used by Mr. Brunel at the Thames Tunnel. The fore part is constructed of iron in the form of a plough, the point being of steel, divided into compartments, which are filled with compressed air, to a degree to equal the outside pressure: the working part is separated from the plough by an air and water-tight partition, fitted with a tube communicating with a pump.

ON THE ANCIENT ARCHITECTURE OF SCOTLAND.

The following is the substance of Mr. Billings's paper, already mentioned:—

As a preliminary remark it was observed, that although the principal monuments of both England and Scotland may be identical in minute details, yet, at the same time, great changes and varieties occurred in various leading features, so as to produce a distinct individuality in the character of the Scottish edifices.

The beautiful little church of Leuchars, in Fife, by some reputed as of Saxon origin, is a fine Norman specimen, with an apsidal east end. The cathedral at Elgin is a beautiful edifice, and the arcaded streets of that town most interesting, somewhat resembling those of Chester, the arcade, however, being on a level with the street, and constructed of stone. At three miles from Elgin is a curious old fire-proof house, at Coxton, in which the alternate stories are arched, with semi-vaultings, the upper one, however, being pointed. The turrets of Cawdor Castle, near Inverness, are curious, being circular in the lower part and octagonal above.

Mr. Billings considered the first Scotch architectural era to have ranged as in England from 1066 to 1200. The Abbey and Palace of Dunfermline, and the Cathedral of Kirkwall, are gigantic examples of that period, and they bear a striking affinity to Durham Cathedral, the solid cylindrical columns in the two being identical: and history informs us that Malcolm the Third in 1093 assisted in laying the foundation of Durham Cathedral, and soon after his return from that place, founded the Abbey of Dunfermline, the first monks of which were from Canterbury. The smaller Scotch buildings of the Norman period approach nearer in beauty to those of England. Among the most beautiful and perfect specimens are the churches at Leuchars and Dalmeney. An endless variety of detail was presented in Scottish architecture, most remarkable; when not only animals and foliage were introduced, but even the signs of the Zodiac. At the period of the transition to the Early Pointed or Lancet, the mouldings of the Scotch building became so minute, as to excite almost a feeling of pity for the workman who had to accomplish such a task. Some of the capitals at Holyrood chapel are a verification of this,—the quality of the ornament was, however, equal to the quantity. At a later period, the system became the very re-

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